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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,024	10/31/2003	Jagir Razak Jainul Abdeen Hussan	JP920030152US1	2138
36993 7590 02/10/2009 IBM ENDICOTT (ANTHONY ENGLAND) LAW OFFICE OF ANTHONY ENGLAND PO Box 5307 AUSTIN, TX 78763-5307			EXAMINER WHALEY, PABLO S	
			ART UNIT 1631	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

10/699,024

Applicant(s)ABDEEN HUSSAN, JAGIR RAZAK
JAINUL**Examiner**

PABLO WHALEY

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/08/2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-6, 10 and 14-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-6, 10 and 14-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Request For Continued Examination

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/08/2008 has been entered.

Status of Claims

Claims 3-6, 10, 14-23 are pending.

Claims 3-6, 10, 14-23 are rejected.

Claims 1-2, 7-9, 11-13 are cancelled.

Objections

The objection to the specification is maintained because the amendment filed 10/08/2008 is not in compliance with MPEP 37 CFR 1.121. In particular, applicant has provided a replacement paragraph that is missing markings that indicate changes. Amendments to the specification, including amendment to a section heading or the title of the invention which are considered for amendment purposes to be an amendment of a paragraph, must be made by submitting: (i) An instruction, which unambiguously identifies the location, to delete one or more paragraphs of the specification, replace a paragraph with one or more replacement paragraphs, or add one or more paragraphs; (ii) The full text of any replacement paragraph with markings to show all the changes relative to the previous version of the paragraph. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strikethrough cannot be easily

perceived; (iii) The full text of any added paragraphs without any underlining; and (iv) The text of a paragraph to be deleted must not be presented with strike-through or placed within double brackets. The instruction to delete may identify a paragraph by its paragraph number or include a few words from the beginning, and end, of the paragraph, if needed for paragraph identification purposes.

Withdrawn Rejections

The rejection of claims 1-11 under 35 U.S.C. 103(a) as being unpatentable over Taylor in view of Kalantri and Huysmans is withdrawn in view of applicant's amendments, filed 10/08/2008.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

This rejection is newly applied.

Claims 3-6, 10, 14-23 are rejected under 35 U.S.C. 101 because these claims are drawn to non-statutory subject matter. These claims are rejected for the following reasons.

The claimed subject matter is directed to a process for storing and presenting sequence data. A claimed process is statutory under 35 U.S.C. 101 if: (1) it is tied to a particular machine or apparatus of statutory subject matter under 35 U.S.C. §101 (i.e. a machine, manufacture, or composition of matter), or (2) it transforms a particular article into a different state or thing (In re Bilski, 88 USPQ2d 1385 Fed. Cir. 2008; In re Comiskey, Fed. Cir., No. 2006-1286).

Regarding the required tie to a particular machine or apparatus, the claimed subject matter is not limited to a particular apparatus or machine. In the instant case, the claims are directed to steps for comparing sequences, storing entries and variations, deleting sequences, and presenting sequences (i.e. manipulating data) and are missing the use of a specific machine for carrying out these steps. To qualify as a statutory process, the claims should require use of a machine within the steps of the claimed subject

matter or require transformation of an article to a different state or thing. Insignificant data gathering or post-solution activity in the claimed subject matter will not be considered sufficient to convert a process that otherwise recites only mental steps into statutory subject matter. Preamble limitations that require the claimed process to comprise machine implemented steps will not be considered sufficient to convert a process that otherwise recites only mental steps into statutory subject matter. The applicants are cautioned against introduction of new matter in an amendment.

Regarding the transformation test, the claimed subject matter does not recite a physical transformation of matter. For example, while claim 14 requires storing sequences and presenting sequence information to a user, the claim does not require any physical assays for sequencing nucleic acids [See *In re Grams*, 12 USPQ2d 1824 (Fed Cir. 1989)]. This rejection could be overcome by amendment of the claims to recite a step wherein an article is reduced to a different state or thing (e.g. physical assay), or a step wherein data representing a physical object or substance that is obtained by a specific physical process is sufficiently manipulated or changed (e.g., raw data into a particular visual depiction of a physical object on a display) [See *In re Abele*, 684, F.2d at 908-909, CCPA, 1982]. The applicants are cautioned against introduction of new matter in an amendment.

Response to Arguments

Applicant's arguments, filed 10/08/2008, that claims 2-11 are statutory based on the amendments are persuasive. However, a new ground of rejection is applied.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4, 5, 10, and 14-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor et al. (Computer and Chemistry, 1999, Vol. 23, p.365-385), in view of Schwartz et al. (Genome Research, 2000, Vol. 10, p.577-586).

Taylor teaches a method and program for storing and presenting sequence data. In particular, the method requires specifying a set of seed probes represented using code identifiers [Table 1], which equates to replets. Each seed probe is compared to a database of sequences and match-sets are generated based on sequence identification, positional matches, and weights indicated degree of match (i.e. offset) [p.371-372, Section 4, p.374, Section 4.1.2, Fig. 3, and Fig. 4]. The iterative search and align cycle includes steps for removing similarity information [Fig. 3]. Gapped regions (i.e. mismatched) are replaced with an expression indicating the range of unmatched characters [p.368, Col. 1], which shows matched regions comprising "don't care" characters. Taylor teaches removing homologues (i.e. matching sequences) [p.370, Table 2, Fig. 5, Discussion]. Taylor shows a step for ordering of sequence information and connecting (i.e. concatenating) overlapping regions, and excluding redundant information from the backbone tree [p.369, Section 3.3.1, Fig. 2]. Taylor teaches constructing sequence matches for candidate template using a look-up table [Fig. 3]. Additionally, Taylor shows a method for identifying multiple subsequences using one sequence code (i.e. replete) [Table 8, p.384, Col. 1]. Taylor shows segmenting matching sequences into parts to account for location-specific variations [Fig. 4, p.381-

382, Section 6]. As Taylor teaches an iterative search cycle wherein high scoring matches are combined with search templates [Fig. 3 and p.378, Col. 1, ¶2], Taylor inherently shows adding new probes (i.e. replets) to a pre-existing set.

Taylor does not specifically teach generating and storing match-data structures wherein redundant match-set data structures corresponding to matched replets are not generated, as in claim 14.

Taylor does not specifically teach storing one or more variations for each matching subsequence, wherein a variation includes a "don't care" character, as in claims 10 and 14.

Taylor does not specifically teach concatenating, in order, unmatched regions of sequences that remain after deleting each matching subsequence to form and store a backbone sequence, as in claim 14.

Taylor does not teach matching "don't care" with a subsequence, as in claim 16.

Taylor does not specifically teach removing a replete from a pre-existing set, as in claim 22.

Taylor does not teach offset information parameters k and delta, as in claim 23.

Schwartz teaches a computer-implemented method for presenting sequence data. In particular, Schwartz teaches the use of a program (RepeatMasker) that specifically generates repeat files based on user submitted query files [p.578, Results, Col. 1 and Col. 2], and identifies redundant match-data structures in the query files being matched in order to prevent the generation of redundant data, as in claim 14. The RepeatMasker program generates masked sequence data (which inherently include "don't care" characters), searches masked sequences against databases, and merges search results to identify genes (i.e. backbone sequences) [p.580, Col. 2], as in claim 16. The method provide several options for generating and storing alignments (i.e. match-data structures) for each initial sequence file, including alignment coordinates, sequence position, and percent identity of gap-free segment information [p.578, Col. 2, Fig. 1], which shows generating sequence information, offset information. Multiple variations for storing matching subsequences is provided [Fig. 1, Fig. 2, Fig. 3, Fig. 4, Fig. 6], as in claims 10 and 14. Matched information is color coded and includes sequence information for exact matches and non-exact

matches [p.580, Col. 2, ¶3, and Fig. 2], which corresponds to a "don't care character." Schwartz teaches concatenating data by chaining overlapping regions that appear in the same order and scoring of unmatched regions [p.582, Col. 2, ¶4, Fig. 6, p.585, Col. 1], as in claim 14. Schwartz teaches scoring parameters for mismatch, gap open, and gap extension used in alignment [Col. 585], which makes obvious offset parameters k and delta, as in claim 23.

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method of Taylor by generating and storing match-data structures wherein redundant match-set data structures corresponding to matched reptlets are not generated, as in claim 14, since Schwartz teaches the use of a computer program (RepeatMasker) that prevents the generation of redundant data [p.578, Results], and since Taylor shows an iterative search and align cycle includes steps for removing similarity information [Fig. 3]. The motivation would have been to improve sequence matching using subroutines for identifying repeats, as suggested by Taylor [p.384, Col. 1, ¶3].

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method of Taylor by storing one or more variations for each matching subsequence, wherein a variation includes a "don't care" character, as in claim 14, and matching "don't care" with a subsequence, as in claim 16, since Schwatz provides multiple variations for identifying redundant matches and storing matching subsequences that includes sequence information for non-exact matches [p.580, Col. 2, Fig. 2, Fig. 6], which shows matching of "don't care" information. The motivation would have been to use a program that can provide useful sequence comparisons even when sequences are not finished or have discontinuities, as suggested by Schwartz [p.581, Col. 1].

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method of Taylor by concatenating, in order, unmatched regions of sequences that remain after deleting each matching subsequence to form and store a backbone sequence, as in claim 14, since Schwartz shows deleting duplicate regions based on chaining regions that appear in the same

order and based on unmatched regions [p.582, Col. 2, ¶4, Fig. 6, p.585, Col. 1]. The motivation would have been to improve sequence matching using flexible and automated methods for avoiding duplicate matches when homologue regions appear in multiplicity, as suggested by Schwartz [p.583, Col. 2, ¶2].

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method of Taylor by removing a replete from a pre-existing set, as in claim 22, since Schwartz shows a step for comparing initial query files to repeat files to avoiding alignment repeats and uninformative information [p.578, Results]. The motivation would have been to improve sequence matching using flexible and automated methods for avoiding duplicate matches when homologue regions appear in multiplicity, as suggested by Schwartz [p.583, Col. 2, ¶2].

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method of Taylor by additionally using offset information parameters k and delta, as in claim 23, since Schwartz teaches scoring parameters for mismatch, gap open, and gap extension used in alignment [Col. 585] and since the choice of variables to denote offset position is an arbitrary design parameter.

Claims 3-6, 10, and 14- 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor et al. (Computer and Chemistry, 1999, Vol. 23, p.365-385), in view of Schwartz et al. (Genome Research, 2000, Vol. 10, p.577-586), as applied to claims 4, 5, 10, and 14-23 above, and further in view of Huysmans et al. (Proteins: Structure, Function, and Genetics, 1991, Vol. 11, p. 59-76).

Taylor and Schwartz make obvious a method for storing and presenting sequence data, as set forth above.

Taylor and Schwartz do not specifically teach storing information in a table using a "pointer", as in claims 3 and 6.

Huysmans teaches a relational database for storing sequence and position identifier data using relational pointers [Table I, Table II, Fig. 4, Fig. 5, p.65, Col. 1]. This method is beneficial for efficiently accessing and manipulating large amounts of information [p.67, Col. 1, p.74, Col. 1].

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method made obvious by Taylor and Schwartz by storing information in a table using a "pointer", as in claims 3 and 6, since Huysmans teaches a relational database for storing sequence and position identifier data using relational pointers obtained from homology-based applications [Abstract, Table I, Table II, Fig. 4, Fig. 5, p.65, Col. 1]. The motivation would have been to incorporate functionality for efficiently accessing and manipulating large amounts of sequence and positional information, as suggested by Huysmans [p.67, Col. 1, p.74, Col. 1].

Response to Arguments

Applicant's arguments filed 10/08/2008 regarding the rejection of claims 1-11 under 35 U.S.C. 103(a) as being unpatentable over Taylor in view of Kalantry and Huysmans have been fully considered and are persuasive. Therefore the rejection has been withdrawn. However, a new ground of rejection has been applied in view of applicant's amendments, filed 10/08/2008, which introduces new claims and new limitations.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pablo Whaley whose telephone number is (571)272-4425. The examiner can normally be reached on 9:30am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached at 571-272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Pablo S. Whaley/

Patent Examiner

Art Unit 1631

/John S. Brusca/

Primary Examiner, Art Unit 1631